Chemistry Questions

❖ **Choose the correct answer:**

1- In the following reaction: $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)} \quad \Delta H = -92Kj$
conc. of ammonia is increased by:

a- decrease in conc. of N_2 **b-** increase in temp.
c- dec. in conc. of hydrogen **d-** increase in pressure

2- When Barium chloride is added to sodium sulphate a……..ppt is formed.

a- white **b-** yellow **c-** blue **d-** violet

3- $FeCl_2$ compound is…………

a- paramagnetic and coloured
b- diamagnetic and colourless
c- Diamagnetic and coloured
d- Paramagnetic and colourless

4- If Kc is < 1 this means………………

a- the backward reaction is predominant.
b- reaction is complete and instant.
c- conc. of reactants are less than products conc.
d- the reversible reaction is predominant

5- The no. of isomers of C_4H_{10} is…………..

a- 2 **b-** 4 **c-** 6 **d-** 10

6- To ppt. 18gm of Al from $_{13}Al^{27}$ by electrolysis of $AlCl_3$ we need …………….Faraday.

a- 0.5 **b-** 1 **c-** 2 **d-** 3

7- The transition element of electronic configuration (Ar) $4s^1$ $3d^{10}$ is…………..

a- Scandium **b-** Vanadium **c-** Manganese **d-** Copper

8- When Lead acetate is added to ……………solution a Black ppt. is formed.

a- sodium sulphate **b-** sodium nitrate
c- sodium phosphate **d-** sodium sulphide

9- In the reaction: $4NO_{(g)} \rightleftharpoons 2N_{2(g)} + 2O_{2(g)} \quad \Delta H = 180Kj/mol$
………………causes dec. in conc. of oxygen gas.

a- adding nitric oxide **b-** adding helium gas
c- heating **d-** cooling

10- If the reduction potential of Zn, Ni are –0.76V , –0.23V respectively the emf is…………….

a- –0.53V **b-** 0.175V **c-** 0.53V **d-** 0.99V

11- Ethyne gas is prepared by adding water to…………..

a- soda – lime **b-** calcium oxide
c- calcium carbide **d-** calcium carbonate

12- The compound 1,2,3 trihydroxy benzene is called…………..

a- ethanol **b-** picric acid **c-** pyrogallol **d-** catechol

❖ Write the scientific term for each statement:

1- Process of dipping steel in molten zinc to protect it from corrosion.
2- The mass of a substance which has the ability to lose or gain one mole of electrons during chemical reaction.
3- Elements which fill 3d sublevel with electrons successively and are placed in period 4 in the periodic table.
4- The chemical substances which change its colour according to the chemical medium to detect end point.
5- Equilibrium which occurs between molecule of weak electrolyte and ions resulting from it.
6- The amount of substance precipitated or consumed at any electrode is directly proportional to the quantity of electricity passing.
7- Organic compounds which consist of carbon and hydrogen only.
8- Process of combination of small molecules together to obtain large molecule of high molecular mass.
9- Minimum amount of energy required for the reacting molecules to react during collision.
10- The chemical compound which decomposes by heat into iron II oxide and carbon dioxide.
11- Quantity of electricity required to ppt. the gram equivalent mass of an element.
12- Group of atoms derived from corresponding alkane that cannot exist alone and have the general formula C_nH_{2n+1}.

❖ Give Reason for

1- The car battery works as galvanic cell and electrolytic cell.
2- Fluorspar is added during extraction of Al from Bauxite.
3- Phenol is more acidic than ethanol.
4- The catalyst does not affect equilibrium position.
5- $_{24}Cr$ and $_{29}Cu$ have unexpected electronic configuration.
6- Indicators are used to identify the end point in neutralization reaction.
7- Detection of Basic radicals is more complicated than acidic radicals.
8- B.P of carboxylic acids is higher than that of corresponding alcohols.
9- Conc. H_2SO_4 is added during esterification reaction.
10- Mn^{+2} ion is difficult to be oxidized to Mn^{+3} ion.
11- Dil. HCl can be used to differentiate between sodium carbonate and sodium nitrite.
12- The lead acid battery is considered a reversible galvanic cell.

❖ Give one use for:

1- Catalyst in industry.
2- Salt bridge in galvanic cell.
3- Ethylene glycol.
4- Potassium permanganate.
5- Natural gas in Medrix furnace.
6- Teflon.

❖ How can you differentiate practically between:

1- Iron II chloride and iron III chloride.
2- Ethanol and acetic acid.
3- Hydrochloric acid and sulphuric acid.
4- Sodium chloride salt and sodium bromide salt.
5- 1-propanol and 2-propanol.

❖ Show by chemical equations how to obtain:

1- Iron II hydroxide from iron III hydroxide.
2- Iron III oxide from iron II oxalate.
3- Black carbon from sodium acetate.
4- Iron II sulphide from magnetic iron oxide.
5- Ethylene glycol from ethanol.
6- Ethyl acetate ester from ethyl alcohol.
7- Toluene from Benzene.
8- Phenol from acetylene.

❖ Problems:

1- Find the time required to ppt. 5.4gms of Ag when electric current intensity 9.65amp. passes in silver nitrate (Ag = 108) cathode reaction is: $Ag^{+} + e^{-} \longrightarrow Ag$

2- Find the volume of water added to 200ml of sodium hydroxide 0.3 mol/L conc. to convert it to a solution of conc. 0.1 mol/L.

3- Hydrated cobalt chloride $CoCl_2.xH_2O$ of mass 9.56gm was heated strongly and we obtain 5.24gm. Find the no. of water molecules of crystallization in hydrated cobalt chloride.

(Co = 60 , Cl = 35.5 , H = 1 , O = 16)

4- A current of intensity 7amp. is passed in nitrate solution of a metal for 4 min. If the mass of cathode before passing the current is 12gm and its mass after passing the current is 13.88g. Find the gram equivalent mass of the metal.

5- Acetic acid solution of conc. 0.5M and degree of ionization is 3%. Find pOH of this solution.

6- Find the mass of Cu ppted. at the cathode on passing and electric current of intensity 10amp. for half an hour in copper sulphate.

(Cu = 63.6)

7- Find the conc. of $[OH^{-}]$ in a solution if conc. of $[H^{+}]$ is 3×10^{-7} mole/L.

8- **The following reaction takes place in a galvanic cell:**

$$Ni^{+2}_{(aq)} + Fe_{(s)} \rightleftharpoons Fe^{+2}_{(aq)} + Ni_{(s)}$$

Find the emf if the reduction potential of Fe , Ni are –0.4V and –0.23V resp.

9- Find the degree of solubility of Ag_2SO_4 in water if its solubility product K_{sp} is 1.4×10^{-4}.

❖ **What is meant by each of the following:**

1) Markownikoff's rule
2) Electromotive series
3) Standard hydrogen electronde
4) Catalytic activity of transition elements
5) Law of Mass Action
6) Faraday

❖ **What is the role of the following scientists in the progress of chemistry:**

1) Ostwald
2) Kekule
3) Gulburg and Waage
4) Wohler
5) Markownikoff
6) Le Chatelier